

**A STUDY ON REMOVAL OF URETHRAL CATHETER  
ON POST OP DAY 2 VS THE CONVENTIONAL POST  
OP DAY 4 AFTER TURP**

*Dissertation submitted to*

**THE TAMIL NADU DR.M.G.R.MEDICAL UNIVESITY**

*In partial fulfillment of the regulations for the award of the degree of*

**M.CH (UROLOGY), BRANCH – VI**



**GOVERNMENT STANLEY MEDICAL COLLEGE AND  
HOSPITAL**

**THE TAMIL NADU DR.M.G.R.MEDICAL UNIVERSITY,  
CHENNAI, INDIA**

**AUGUST 2012**

## **DECLARATION**

I solemnly declare that this dissertation “A study on removal of urethral catheter on Post-op day 2 Vs the conventional Post-op day 4 after TURP” was prepared by me in the Department of Urology, Government Stanley Medical College and Hospital, Chennai under the guidance and supervision of Prof.Dr.R.Radhakrishnan, MS., M.Ch., Professor and Head, Department of Urology, Government Stanley Medical College, Chennai between 2009 and 2012.

This dissertation is submitted to the Tamil Nadu Dr.M.G.R.Medical University, Chennai for the award of the degree of M.Ch Genitourinary Surgery.

Place : Chennai

Date :

## **CERTIFICATE**

I hereby certify that this Dissertation titled “A study on removal of urethral catheter on Post-op day 2 Vs the conventional Post-op day 4 after TURP” is a bonafide work undertaken by Dr.D.Jason Philip, M.Ch (Urology) Postgraduate student at the Department of Urology, Government Stanley Medical College and Hospital, Chennai-1 between the period 2009 to 2012.

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I wish to express my sincere thanks to the Dean, Government Stanley Medical College and Hospital for kindly permitting me to carry out this study at Government Stanley Medical College Hospital, Chennai.

## **INFORMED CONSENT FORM**

I, \_\_\_\_\_ am willing to participate in the study titled.

“A study on removal of urethral catheter on Post-op day 2 Vs the conventional Post-op day 4 after TURP”

My clinical condition, diagnosis and treatment plan have been explained to me by the doctor. The need for catheter placement after surgery and the study design of catheter removal after surgery have been discussed with me by the doctor. The purpose and advantages of the study has been explained to me in my mother tongue by the investigator. I am also aware that I can discontinue from the study whenever I wish to do so.

Signature of patient

Date :

Place :

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## **INTRODUCTION**

The prostate is the most common site of urological disease in man. It is also the male organ most commonly affected with either benign or malignant neoplasms. The most prevalent and clinically significant form of abnormal prostate growth is benign prostatic hyperplasia (BPH).

The incidence is age related. The incidence of histological BPH in autopsy series rises from around 20% in men between 40-50 years to 50% in men aged 51-60 years to over 90% in men older than 80. Although the clinical manifestations of this disease is less common than this, symptoms of BPH also are related to increasing age-25% of men report obstructing voiding symptoms at age 55. At the age of 75, 50% of men are symptomatic.

The symptoms of BPH can broadly be divided into obstructive and irritative complaints. Obstructive symptoms of BPH include hesitancy, decreased force and caliber of stream, sensation of incomplete bladder emptying, double voiding, straining to urinate and post-void dribbling. Irritative voiding symptoms include urgency, frequency and nocturia.

Improved understanding of the aetiology and pathology of this extremely common disease has expanded the treatment options available to us. Alpha adrenergic blockade, 5 alpha reductase inhibitors, open prostatectomy, transurethral resection of the prostate (TURP), transurethral incision of the prostate (TUIP), interstitial laser therapy, transurethral electrovaporisation of prostate, transurethral microwave therapy, transurethral needle ablation of the prostate (TUNA) and high intensity focussed ultrasound (HFU) are some of the treatment options currently available.

Despite the availability of a bewildering array of treatment modalities, Transurethral resection of prostate (TURP) introduced in the late 1920s and early 1930s, has revolutionised the treatment of BPH and is currently regarded as the 'gold standard' treatment for BPH, against which all other treatment modalities are evaluated.

Currently, when surgery is performed for BPH, TURP is the choice in over 95% of cases. The high prevalence of symptomatic BPH in the aging male population, and the pre-eminence of TURP in its treatment has focussed attention on the after – effects of this form of surgery. Research has gone into the morbidity of this



surgery itself and its cost-burden on society.

Traditionally, after this surgery, a foley catheter is placed transurethrally and is removed around the 4<sup>th</sup> post-op day. Post operative placement of a catheter after TURP provides for efficient bladder drainage after surgery, a means of bladder irrigation to prevent blood clots and acts as a tamponade on small bleeding points. Urinary retention developing after catheter removal after TURP may be related to persistent urethral obstruction or decreased/ absent detrusor contractility. Although older literature reports failure to void following post-TURP catheter removal (0.5-11% of cases), there is little or no mention of the exact duration of catheterisation following TURP. No standardised criteria for removal of catheter after TURP exists in literature.

Traditionally, the catheter is removed at around 4 days post – TURP. I conducted this study at our institution to help in deciding the interval for catheter removal following TURP, that is most beneficial to patients.

## **REVIEW OF LITERATURE**

BPH was first recognized as a clinical problem with a source in the central area of the prostate by Morgagni in 1760. It was Hugh Hampton Young who surgically removed this tissue nearly 100 years later at the John Hopkins Hospital. Mc Neal's landmark work elucidating the zonal anatomy of the prostate as the peripheral zone, the central zone, the transition zone and anterior fibro muscular stroma has further improved our understanding of the organ and its most common problem.

The pioneering work of Davis, Alcock, Stern, Mc Carthy and Nesbit resulted in the introduction of transurethral resection of prostate (TURP) in the late 1920s and early 1930s. This was the first endoscopic surgery in history and revolutionised the very concept of how surgery can be performed. In the past century, a lot of research has gone into the aetiology, pathology, natural evolution, clinical manifestations, investigations and treatment of this disease.

### **AETIOLOGY:**

Shapiro, in a review of the embryological development of the prostate, gave us insights into the aetiology of BPH. The fact that

the prostate is the only human organ that delays new growth until advanced age and that the acinar development within the prostate remains dormant during and after puberty, is vastly different from ductule acinar development in other human organs.

The elegant work of Cunha and Chug demonstrated that interaction between the urogenital mesenchyme and prostatic epithelial cells, termed “embryonic reawakening”, plays a major role in prostatic growth and development. That the dog and the human being are practically the only two animals to develop BPH has been noted by researchers. These two species alone demonstrate an anatomical configuration in which the urethra traverses the prostate to enter the bladder. It is believed that the close relationship of these two anatomical structures and the fact that the passage of urine and semen, which may contain growth factors or carcinogens may permeate the periurethral prostatic glands, might be important for the development of BPH.

Lee and colleagues postulated the intrinsic and extrinsic factors associated with BPH.

## **THE INTRINSIC FACTORS ARE:**

- Stromal element
- Fibroblasts
- Smooth muscle cells
- Extracellular matrix components
- Luminal epithelial cells
- Basal epithelial cells.
- Neuro endocrine factors.

## **THE EXTRINSIC FACTORS ARE:**

- Heredity
- Dietary factors
- Testicular androgens
- Oestrogens
- Non – androgenic endocrine factors
- Non – testicular endocrine factors
- Neurotransmitters.

## **PATHOLOGY**

BPH develops in the transition zone. It is a hyperplastic process due to an increase in number of cells. Microscopically, there is a nodular pattern with varying amounts of stroma and epithelium. Stroma is composed of varying amounts of collagen and smooth muscles. This dual representation of histological components explain the dual responsiveness to medical treatment. Alpha blockade may produce good results in patient with significant smooth muscle component while 5-alpha reductase inhibitors may produce a better response in BPH composed mainly of epithelial elements. As BPH nodules grow in the transition zone, a so – called surgical capsule forms when they compress the outer zones of the prostate. This serves as a cleavage plane in enucleation.

## **PATHOPHYSIOLOGY**

The pathophysiology of BPH is complex. Prostatic hyperplasia raises the urethral resistance, resulting in compensatory changes in bladder function. When outlet resistance increases, the elevated detrusor pressure required to maintain urine flow occurs at the expense of normal bladder storage function. The changes in detrusor function elicited by obstruction in addition with the age-associated changes in the bladder and in the neurological system lead to urinary frequency, urgency and nocturia, some of the most important and bothersome of BPH symptoms. Thus an understanding of BPH pathophysiology requires an indepth understanding of obstruction- induced bladder dysfunction.

BPH is a hyperplastic and not a hypertrophic process, i.e. there is an actual increase in the number of cells of the prostate. McNeal's landmark studies demonstrate that the majority of early periurethral nodules are purely stromal in character. In contrast, the earliest transition zone nodules are from proliferation of glandular tissue cells. These glandular nodules appear to be derived from newly formed small duct branches that arise from the existing ducts. This gives rise to a totally new duct system. This variety of

neo gland formation is a very rare process outside the embryology of early organ formation. Thus the term 'embryological reawakening', often used to describe BPH seems to be very apt. During the beginning of BPH development, there is overwhelmingly, an increase in the number of nodules. After this phase, another phase of evolution occurs in which an enlargement of the size of the nodules occurs. There is a lot of pleomorphism in the ratio of stromal to epithelial tissues in BPH specimens.

### **STROMAL EPITHELIAL INTERACTION**

The stromal and the epithelial cells have a paracrine type of communication. One class of stromal cell excretory protein (extracellular matrix) partially regulates epithelial cell differentiation. Thus defects in stromal components that usually serve to inhibit cell proliferation could result in benign prostatic hyperplasia. Many of the prostatic stromal- epithelial interactions both in normal development of the prostate and in benign prostatic hyperplasia are mediated by soluble growth factors.

### **GROWTH FACTORS**

Growth factors are peptides that stimulate cell multiplication. Surface receptors are present on the cells that are targeted by these



peptides. These are in turn linked to various intracellular second messengers. The interactions that occur between growth factors and steroid hormones has the potential to change the balance of cell proliferation versus cell death resulting in the development of benign prostatic hyperplasia. Basic fibroblast growth factor (bFGF), fibroblast growth factor-3 (FGF-2), Acidic fibroblast growth factor (FGF-1), Int-2 (FGF-3), Keratinocyte growth factor (KGF, FGF-7), transforming growth factor  $\beta$  (TGF- $\beta$ ) and epidermal growth factor (EGF) have been implicated in BPH.

It is generally accepted that growth stimulatory factors such as the FGF family, vascular endothelial growth factor (VEGF), and insulin-like growth factor (IGF) may play a role, with dihydrotestosterone augmenting the growth factor effects. In contrast to these TGF - $\beta$  which is known for its inhibitory effects on epithelial cell proliferation, may normally exert an inhibitory influence over epithelial proliferation that is lost in benign prostatic hyperplasia.

## **OTHER SIGNALLING PATHWAYS**

The sympathetic signal pathways are considered to be a vital part of the pathophysiology of benign prostatic hyperplasia, and the

evidence from this comes from the effectiveness of  $\alpha$ -adrenergic receptor blockers in the treatment of benign prostatic hyperplasia. Alpha- adrenergic pathways modulate the smooth muscle phenotype in the prostate. All the components of the renin-angiotensin system (RAS) are present in the prostate and are activated in benign prostatic hyperplasia. With the activation of sympathetic signalling pathways, local RAS pathways may contribute to cell proliferation and smooth muscle contraction. The early growth response gene-1 (EGR 1) transcription regulation pathway is also active in benign prostatic hyperplasia.

## **ROLE OF CYTOKINES IN BENIGN PROSTATIC HYPERPLASIA**

Inflammatory cell infiltrates that are seen in many men with benign prostatic hyperplasia are additional sources of growth factors in human BPH. Peripheral blood and tumour infiltrating cells are known to express VEGF, a potent epithelial mitogenic factor. T cells secrete a variety of growth factors, including HB-EGF and bFGF/FGF-2. Significant levels of interleukin-2, interleukin-4, interleukin-7, interleukin-17, interferon  $\gamma$  (IFN- $\gamma$ ) and their respective receptors are found in BPH tissue. Prostatic epithelial senility results in increased expression of interleukin-8,

which promotes proliferation of non-senescent epithelial and stromal cells. This chronic inflammation in benign prostatic hyperplasia also upregulates cyclo-oxygenase 2 (COX-2) in the glandular epithelium. Thus inflammation pathways and cytokines play an important role in benign prostatic hyperplasia.

## **GENETIC AND FAMILIAL FACTORS**

There is a large volume of evidence pointing to genetic components in benign prostatic hyperplasia. The hazard- function ratio for clinically evident BPH among first degree male relatives of BPH cases compared with the first degree male relatives of controls is 4.2 (95% confidence interval 1.7 to 10.2), showing a very strong relationship. Segregation analysis studies are consistent with an autosomal dominant inheritance pattern. Many cases of early (less than 60 years) onset clinically significant BPH could be attributed to heredity. In addition, monozygotic twins show a higher concordance rate for benign prostatic hyperplasia than dizygotic twins. Regression analysis studies have shown that familial benign prostatic hyperplasia is characterised by a large prostatic size, with a mean prostatic volume of 82.7ml in men with hereditary BPH compared with 55.5ml in men with sporadic BPH.

## **NATURAL HISTORY**

The natural history of a disease is its prognosis over time, ideally without treatment. The natural history of a disease is usually studied in prospective cohort studies wherein people affected by the condition are followed over time. However, practical conditions mean that ideal study conditions are rarely satisfied. The traditional model of BPH in which bladder outlet obstruction is caused by the physical obstruction to urine flow by the enlarged adenoma is an over simplistic explanation. Research into the natural history of benign prostatic hyperplasia contradicts this model.

Poor correlation between symptom severity and the severity of urodynamic measurements of obstruction, the poor correlation between improvements in symptoms and improvement in degree of obstruction with treatment and the fact that prostatectomy is relatively effective at symptom relief even in the absence of documented obstruction all point to the fact that several other factors apart from the physically enlarged prostate are involved in patient symptomatology in BPH.

Since even clinicians disagree about how best to define 'Clinical BPH' in practice, there is as yet no widely accepted

epidemiological definition of a case of BPH that can be used to enroll patients in natural history studies. Several cohort studies have followed men after presentation to a urologist with clinical features that can be ascribed to BPH.

In his famous study, Clarke retrospectively examined the outcomes in 36 men who were believed to have BPH but did not have absolute indications at baseline for surgery. The diagnosis was based on symptoms, PR findings and cystoscopy findings. The mean age of the patients studied was 64 years. Over an observational period of 3 years, 25 of the men had symptomatic improvement and overall 31 men had either symptomatic improvement or stable symptoms over almost 3 years. At the end of follow-up, 12 men had undergone surgery. The indications for surgery were not clearly defined.

In 1968, Lytton and co-workers estimated that the chance of a 40 year old man having a prostatectomy in his lifetime was approximately 10%. However, Glynn and colleagues in 1985 raised this estimate to 29%. Alright and associates in 1991, postulated that men older than 60 years had a 39% risk of requiring surgery in the next 20 years, men 50 to 59 years of age, a 24% chance, and men

40-49 years a 13% chance.

The most common reasons for recommending intervention in a patient with symptoms of bladder outlet obstruction and irritability are that the symptoms are moderate to severe, bothersome and interfere with the quality of life of the patient.

## **EPIDEMIOLOGY OF BENIGN PROSTATIC HYPERPLASIA**

BPH is a common condition in men over 50 years of age and is one of the most common reasons for surgery in men of this age group. In the U.S alone, around 200,000 TURPs are performed every year. Thus, considering the aging of the general population due to better health care delivery world wide, BPH represents a significant burden on health care.

The age – specific autopsy prevalence of histologically defined BPH has been shown to be relatively consistent around the world, regardless of ethnicity. However, rates of surgery vary widely among various geographic regions and among races. The variation stems from the lack of universally accepted diagnostic criteria, variations in referral patterns and wide differences among cultures in health care systems and willingness to seek medical care, aside from true potential clinical differences.

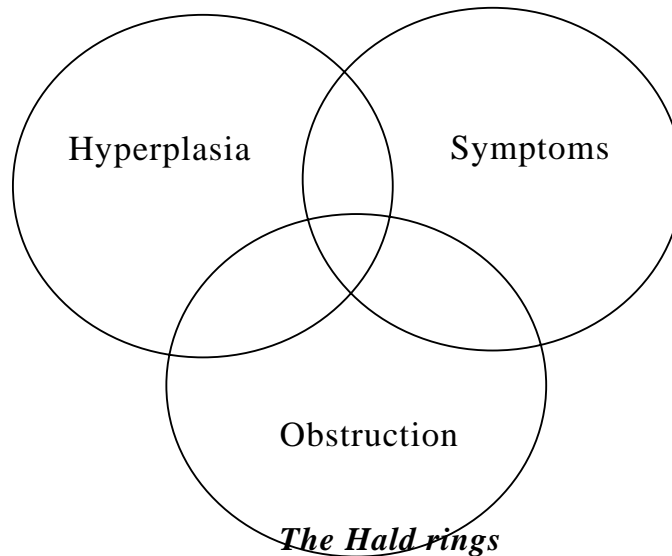
Cross – cultural prevalence comparisons are hampered by the lack of a standardised case definition. Age, hormonal and biochemical factors, smoking, alcohol intake, medication use, obesity and family history have been associated with the

development of BPH or with surgery for BPH. Untreated, BPH can result in continued prostatic growth, with deterioration in urine flow, worsening of symptoms and decrease in quality of life.



## CLINICAL MANIFESTATIONS

The relationship between BPH, symptoms and obstruction was summarised in a simple manner by Hald and have come to be known as the ‘Hald rings’



The first ring in Hald rings is hyperplasia and the second is obstruction. A precise definition of bladder outlet obstruction is lacking in literature but it basically covers static and dynamic obstruction anatomically located at the bladder neck, the prostate and the urethra, and can theoretically be determined by a pressure flow study.

Since the symptoms complex of ‘prostatism’ is neither pathognomonic for BPH, nor only related to diseases of the prostate (these symptoms have been described in female patients

who obviously do not have a prostate), a more accurate and widely used expression is Lower Urinary Tract Symptoms (LUTS). Traditionally LUTS has been divided into obstructive and irritative symptoms.

Obstructive symptoms can be hesitancy, decreased force or calibre of the stream, sensation of incomplete bladder emptying, double voiding, straining to pass urine and post – void dribbling. Irritative symptoms include urgency, frequency and nocturia.

The self – administered questionnaire developed by the American urological association (AUA) is both valid and reliable in identifying the need to treat patients and in monitoring their response to therapy. This questionnaire is perhaps the single most important tool used in evaluation of patient with BPH. This assessment focuses on 7 items that ask patients to quantify the severity of their obstructive or irritative complaints on a scale of 0-5. Thus, the score can range from 0 to 35. A symptoms score of 0-7 is considered mild, 8-19 is considered moderate and 20-35 is considered severe.

A physical examination, DRE and focussed neurological examination are performed on all patients. Note is made of the size and

consistency of the prostate. BPH usually results in a smooth, firm, elastic enlargement of the prostate. Any induration should alert the doctor to the possibility of cancer and the need for further evaluation.

## THE AUA QUESTIONNAIRE

S. No	Urinary symptoms (Symptoms score criteria)	Not at all	Less than 1 time in 5	Less than half the time	About half the time	More than half the time	Almost always
1.	In complete emptying: Over the past month how often have you had a sensation of not emptying your bladder completely?	0	1	2	3	4	5
2.	Frequency: Over the past month, how often have you had to urinate again less than 2 hours after you finished urinating?	0	1	2	3	4	5
3.	Intermittency: Over the past month, how often have you found you stopped and started again several times you urinate?	0	1	2	3	4	5
4.	Urgency: Over the past month how often have you found it difficult to post pone urination?	0	1	2	3	4	5
5.	Weak stream: Over the past month, how often have you had a weak urine stream?	0	1	2	3	4	5
6.	Straining: Over the past month how often have you had to push to begin urination?	0	1	2	3	4	5
7.	Nocturia: Over the past month, how many times did you get up to urinate at night?	0	1	2	3	4	5

## **INVESTIGATIONS**

A urinalysis to exclude haematuria or infection and serum creatinine to assess renal function are required. Renal insufficiency may be observed in 10% of patients and warrants upper tract imaging. Serum PSA is considered by most clinicians to be optional. Upper tract imaging (Intravenous urogram or renal ultrasound) is recommended only in the presence of concomitant urinary tract disease or complications from BPH (eg. Haematuria, urinary tract infection, renal insufficiency, history of stone disease). Cystoscopy is not routinely recommended in BPH patients. Cystometrograms and urodynamic profiles are reserved for patients with suspected neurological disease or those who have failed prostate surgery. Measurements of flow rate, determination of post – void residual urine and pressure flow studies are considered optional.

## **AVAILABLE TREATMENT OPTIONS FOR BPH**

- 1) Medical therapy with alpha adrenergic blockade, 5 alpha reductase inhibitors.
- 2) A combination of the above
- 3) Phytotherapy

- 4) Transurethral resection of the prostate (TURP)
- 5) Transurethral incision of the prostate (TUIP)
- 6) Open simple prostatectomy – suprapubic or retropubic
- 7) Interstitial laser therapy
- 8) Transurethral electrovaporisation of the prostate
- 9) Transurethral microwave therapy (TUMT)
- 10) Transurethral needle ablation (TUNA)
- 11) High – intensity focussed ultrasound (HIFU)

Of all these, TURP is considered the ‘gold standard’ treatment for BPH.

## **TRANSURETHRAL RESECTION OF THE PROSTATE**

The introduction of TURP in the early 1900s where a prostatectomy is conducted without the typical and painful incision and associated convalescence was a milestone in the history of urology. Today TURP has nearly replaced open prostatectomy, which is currently reserved for patients with prostates too large to resect, for patients with co-existent bladder disease managed concurrently with the prostatectomy, and for those few men with orthopaedic disabilities which preclude their being placed in a proper dorsal lithotomy position.

For decades the dominant major surgery performed by urologists, TURP is being severely challenged by the advent of an array of new strategies in BPH management-both medical and invasive therapies. Further the studies of Wasson and Co-workers has enhanced the concept of 'watchful waiting' in BPH.

Yet, though several treatment strategies have been devised and continue to be published, almost all authors continue to refer to TURP as the 'gold standard treatment' for BPH. Even in this era of breath taking medical innovations, this operation continues to be the benchmark against which all other treatments are assessed.

Most urologists regard TURP as the most difficult and most important of all elective urological operations. TURP retains the same severe learning curve that existed when it was first performed almost a hundred years ago.

Patient selection for TURP is important for its success. It is vital that cases of prostatic cancer be excluded before undertaking a TURP for presumed benign disease. The available diagnostic tools to achieve this exclusion include the DRE and the serum PSA, along with its various derivatives-age- adjusted PSA, free Vs complexed PSA, PSA velocity and PSA density.

In the properly selected patient, no therapy equals the potential for durable symptom relief as does TURP, except for open prostatectomy, whose higher morbidity has confined its utility to specific defined indications. Indications for TURP include absolute and relative.



## **ABSOLUTE INDICATIONS FOR TURP IN BPH ARE**

- 1) Recurrent urinary tract infection
- 2) Refractory haematuria
- 3) Upper tract damage
- 4) Secondary vesical calculi
- 5) Urinary retention that fails trial voiding

However, the vast majority of men undergoing TURP do so for symptom relief. Today these are often men who have failed medical therapy. In a 1997 AUA- Gallup survey, most American urologists suggested medical management as their initial therapeutic intervention in BPH. These data and mounting worldwide sales of alpha blockers and 5 alpha reductase inhibitors document the enormous shift to medical management as at least first therapy for BPH. Given the at least initial success rates of medical management, it would seem reasonable that today TURP be reserved for those men who have failed a trial of medical management unless, when presented with the option of currently

existing treatments along with their respective probabilities of outcome, the patient selects the very high likelihood of an immediate successful result offered by TURP. Wasson and colleagues reported in their prospective randomised trial of TURP Vs “Watchful Waiting”, that outcomes of surgery were best for men who were most bothered by their urinary symptoms at baseline.

No data exist to support a concept of early TURP, i.e. operating at a young age and thus avoiding future urological complications and the need of operating upon an older patient who is infirm.

In the evaluation of men with LUTS, there has occurred a recent shift away from the traditional ‘hard’ parameters of assessment (Flowrates, residual urines, urodynamic studies, cystoscopy, sonography and IVU) to the “Soft” parameters (Symptom indices and bother indices). Indeed the latter have become the more relevant in the selection of therapy, especially TURP. The availability of the AUA symptom score and the BPH impact index have provided tools to quantitate the severity of symptoms and their impact on the patient’s quality of life, thus placing stress on the concept that therapy makes the greatest sense

in those most bothered.

Once the decision for surgery has been made, the volume of the prostate becomes an essential factor. Many urologists favour Trans – urethral incision of the prostate (TUIP) over TURP in men with prostates of small volume. The AHCPR guidelines share this view and regard TUIP as an underutilised procedure in BPH. Likewise, it is equally important for the urologist to determine pre operatively that the patient's prostate is not so large as to exceed his resecting capacity. Embarking on TURP on a gland that is too large for this procedure can end in a “Channel TURP” result, excessive bleeding or other major complications. Also, it is important that the patient undergoing TURP be advised in details by his urologist of the procedure's intended objectives and its recognised complications.

## **SURGICAL TECHNIQUE**

There are certain essential principles in performing a TURP. First, the surgeon should establish and then rigidly follow a single routine sequence of resection. The urologist must at all times maintain within his mind a three dimensional image of the prostate and its surrounding structures. The resection should preferably produce long thick chips of large volume. It should be the objective of the resectionist to remove the great bulk of the prostatic adenoma, essentially replicating the enucleation achieved with open prostatectomy. On the other hand, it is not necessary, nor indeed is it desirable, to be a fanatical “capsule seeker”. A residual thin rim of adenoma next to the surgical capsule is preferable to cutting too deep and creating capsular perforations. The resection and establishment of reasonable haemostasis must be completed in one area of the operation before proceeding to the next. It must be remembered that the verumontanum is the distal land mark of the resection. The appearance of the external urethral sphincter must be recognised by the surgeon. This important structure must not be harmed.

## **COMPLICATION OF TURP**

- 1) Bleeding
- 2) TURP Syndrome
- 3) Rectal perforation
- 4) Anaesthesia – related complications
- 5) Post – op urinary retention
- 6) Infection
- 7) Bladder neck contracture
- 8) Urethral stricture
- 9) Incontinence
- 10) Impotence
- 11) Retrograde ejaculation

Technological improvements in lighting, resectoscope design, lens crafting, anaesthetic care, surgical technique and improved antibiotics have greatly improved the morbidity profile of TURP.

## **THE SALINE TURP**

The most important disadvantage of standard monopolar TURP is the requirement of hypotonic irrigating solution that carry the risk of dilutional hyponatraemia and TURP syndrome. Bipolar TURP was developed to allow the operation to be performed in a normal saline environment and theoretically allow for longer and safer resection. The traditional monopolar TURP uses an active electrode loop to transmit energy into tissue and a return electrode at the skin to complete the circuit. The electrical resistance creates temperatures as high as 400<sup>0</sup>c. Bipolar technology allows high initialising voltage to establish a voltage gradient in the gap between two electrodes. In essence, the active and return poles are incorporated into the electrode design. This energy converts the conductive medium (Saline) into a plasma field of highly ionised particles. This field disrupts the molecular bonds between the tissues, allowing the high – temperature loop to provide rapid vapourisation and desiccation of prostate tissue and result in a “Cut and Seal” effect. This effect supposedly reduce resection times.

## **CATHETERS AFTER TURP**

Post-operative catheterisation following trans-urethral resection of prostate provides for efficient bladder drainage after surgery, a means by which the bladder can be irrigated to prevent blood clots, and also as a tamponade on small bleeding points. Catheters differ in size, shape, types of material, number of lumens and types of retaining mechanisms. Large – caliber catheters are used to evacuate potential blood clots after TURP. Triple lumen catheters have smaller lumens than two- way catheters. However these provide vital bladder irrigation after TURP and hence are traditionally inserted transurethrally after a TURP procedure. The rigidity of the catheter, the ratio between internal and external diameters and the bio compatibility depend on the material with which the catheter is made. Mucosal irritation is reduced when catheters with a low co-efficient of friction are used. A 22 French three way Foley urethral catheter is the standard catheter chosen by most urologists after TURP.

## **STUDY DESIGNS IN BPH**

Many clinical studies in BPH are of high quality, but some still contain deficiencies in design, conduct, analysis or presentations. Some qualify as only 'pilot studies'. Hence certain general criteria have been laid down in urological literature for studies involving BPH. These are (1) lack of bias (2) an adequate number of subjects (3) appropriate and sensitive methods of evaluation and (4) statistical variation. Bias usually does not constitute a problem. However, unconscious or conscious bias can occur either in the assignment or choice of patients.

A number of primary considerations are relevant to sample size: (1) The natural history of BPH (2) The magnitude of difference expected if a positive result occurred due to intervention (3) The desired level of statistical significance (4) The standard deviation expected and (5) The number of dropouts expected. The size must be sufficient to prove or disprove a hypothesis or hypotheses and presumably to detect clinically important changes. However, the sample size should not be so large as to make small and clinically insignificant differences significant from a statistical stand point. In considering objective changes, the concept of



clinical versus statistical significance must be kept in mind. Subjective variables are difficult to quantify, and many such variables are often graded according to severity and the resultant changes in grade subjected to analysis, either separately or in groups. Lead-in period, data variables, stratification, patient priorities and meta-analysis are some of the other considerations in studies conducted in BPH.

## **AIMS AND OBJECTIVES**

- 1) To observe the patient after removal of urethral catheter on POD – 2 and POD – 4 after TURP for BPH
- 2) To assess which modality (POD – 2 removal Vs POD -4 removal of catheter) has overall benefits for the patient undergoing TURP.
- 3) To compare the outcome parameters in both groups- like post-op PVR and uroflowmetry and the complication profile.
- 4) To know whether the early removal of catheter in post-TURP patients will be beneficial when compared to the conventional 4<sup>th</sup> day catheter removal, since keeping a large diameter 22F foley catheter is often very inconvenient for the patient.
- 5) To know whether post-TURP complications are reduced by early removal of catheter.

## DESIGN OF STUDY

Period of study	:	2009-2012
Number of Patients studied	:	68
Age range	:	45-85 years
Common presentations	:	Straining to void Irritative voiding symptoms AUR Refractory Haematuria
Investigations	:	Urine analysis Urine Culture Complete blood count USG KUB with Prostate Size, PVR estimation XRay KUB Uroflowmetry

**INCLUSION CRITERIA:**

1. All BPH patients admitted to ward and planned for TURP were counselled. Patients giving consent to be part of the study were selected.

**EXCLUSION CREITERIA:**

The following category of patients were excluded from the study:

- 1) Diabetics
- 2) patients with history of cerebrovascular accidents
- 3) Co-existent stricture urethra
- 4) Those who were subjected to a simultaneous endoscopic procedure like cystolitholapaxy or internal urethrotomy.
- 5) Patients with biopsy proven prostate cancer (undergoing channel TURP) were excluded.

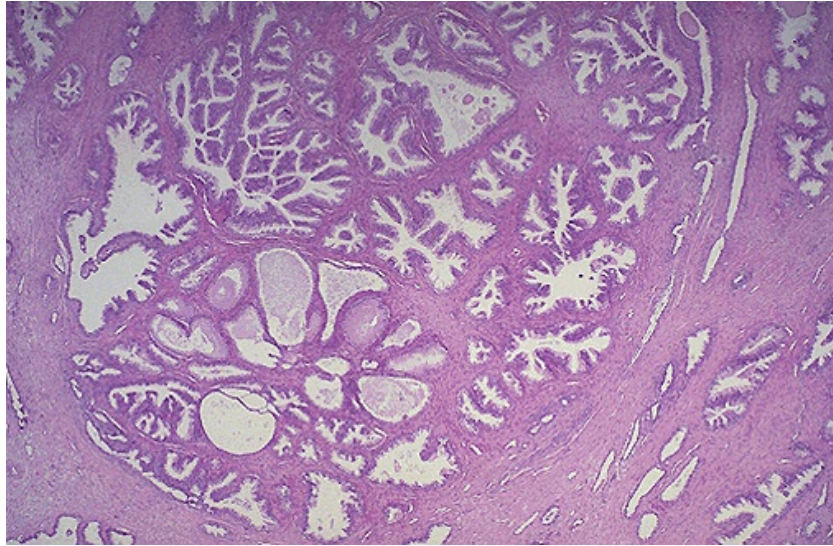
## **MATERIALS AND METHODS**

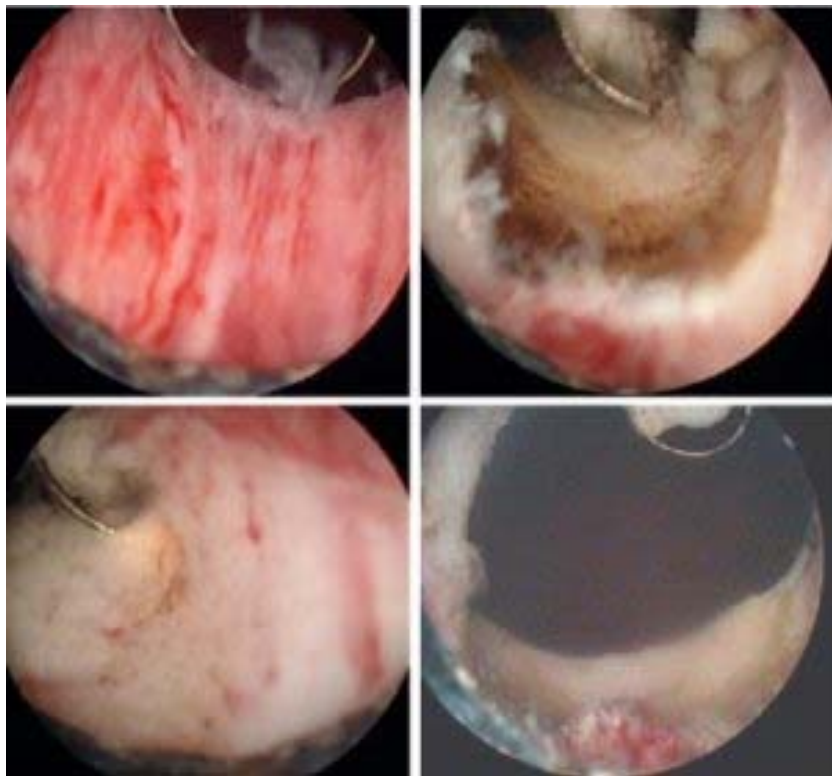
A total of 68 patients were enrolled in the study. Age, size of the prostate (as determined by USG KUB), P.R grade of prostate, cystoscopic grade at TURP were recorded. Patients were assigned to POD – 2 and POD – 4 groups. Standard TURP was performed on all patients. A 24 french resectoscope was used with routine precautions taken to achieve maximum haemostasis without undue prolongation of resection time. Immediately after surgery, all patients had a 3 way foley urethral catheter placed with saline irrigation.

The patients were basically divided into two groups. Group I included patients in whom the catheter was removed on POD – 2 and Group – II included patients in whom catheters were removed on POD-4

After removal of catheter, the patients were observed and outcomes carefully recorded. Parameters like uroflowmetry and PVR were recorded post-op, evaluated and compared.

## **PHOTOGRAPHS**







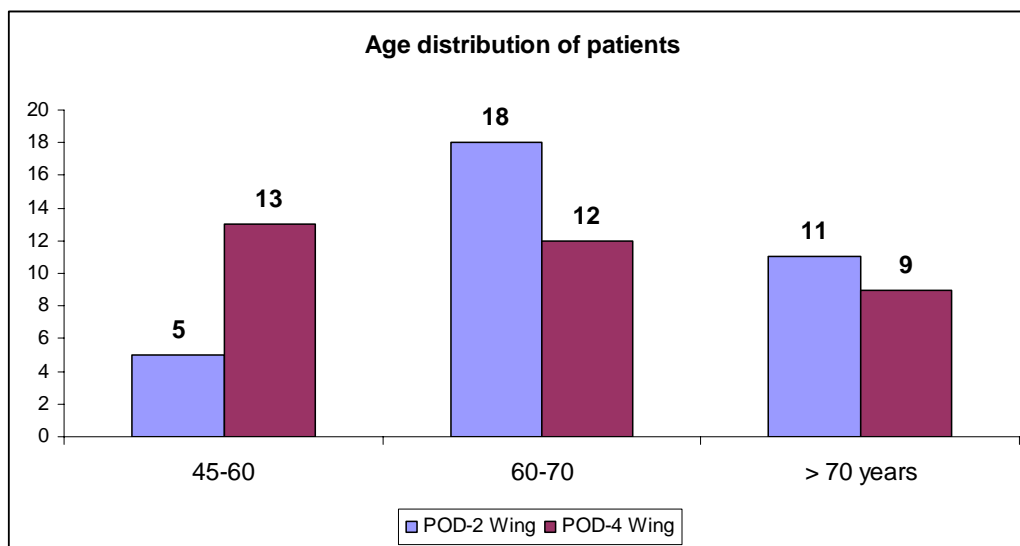


## RESULTS

*Table-1: Age distribution of patients*

Age Group (Years)	POD-2 Wing	POD-4 Wing	P Value
45-60	5	13	0.084
60-70	18	12	
> 70 years	11	9	

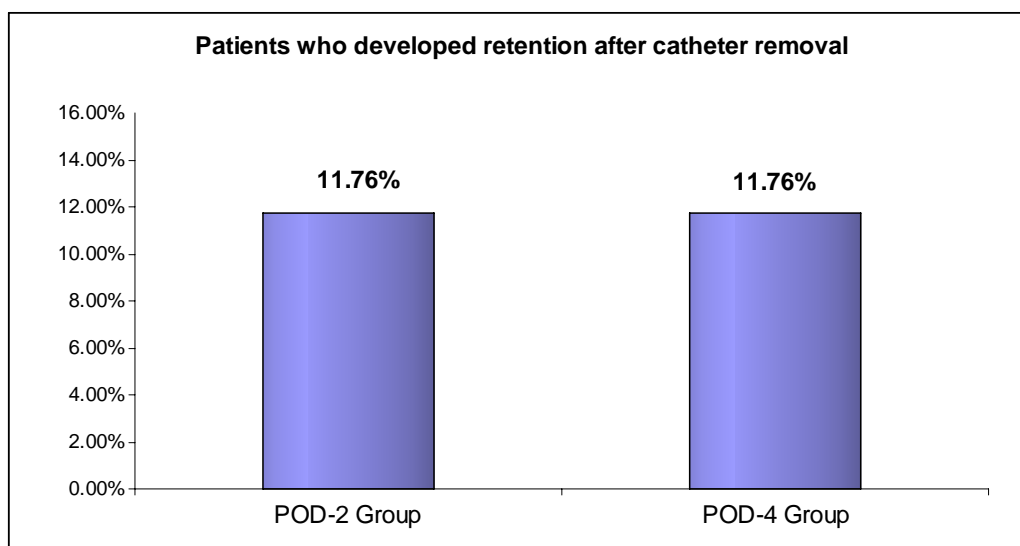
*Fig-1: Age distribution of patients*



**Table-2: Patients who developed retention after catheter removal**

<b>Group</b>	<b>Total Patients</b>	<b>Patient with post catheter removal urinary retention (requiring re-catheterisation)</b>	<b>Percentage</b>	<b>P Value</b>
POD-2 Group	34	4	11.76%	1.000 (Not significant)
POD-4 Group	34	4	11.76%	

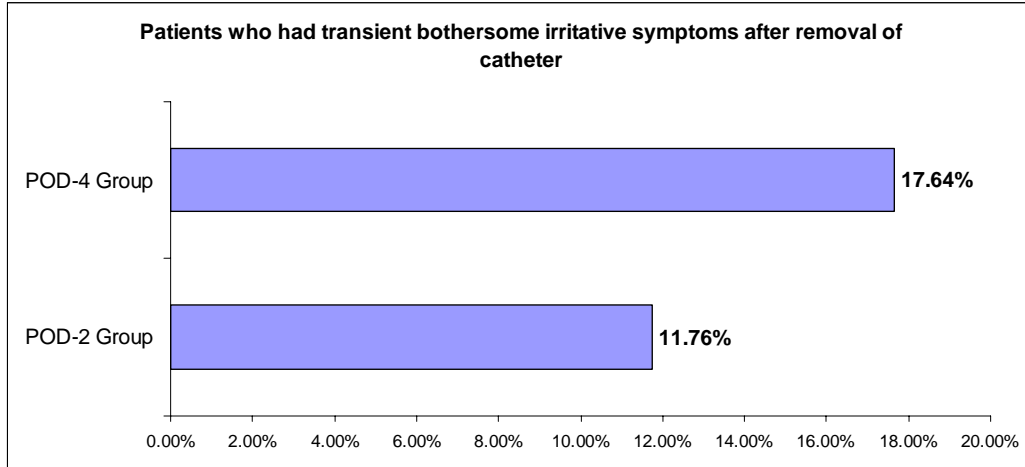
**Fig-2: Patients who developed retention after catheter removal**



**Table-3: Patients who had transient bothersome irritative symptoms after removal of catheter**

<b>Group</b>	<b>Total</b>	<b>Those who developed irritative voiding symptoms (dysuria) after catheter removal</b>	<b>Percentage</b>	<b>P Value</b>
POD-2 Group	34	4	11.76%	0.493 (Not significant)
POD-4 Group	34	6	17.64%	

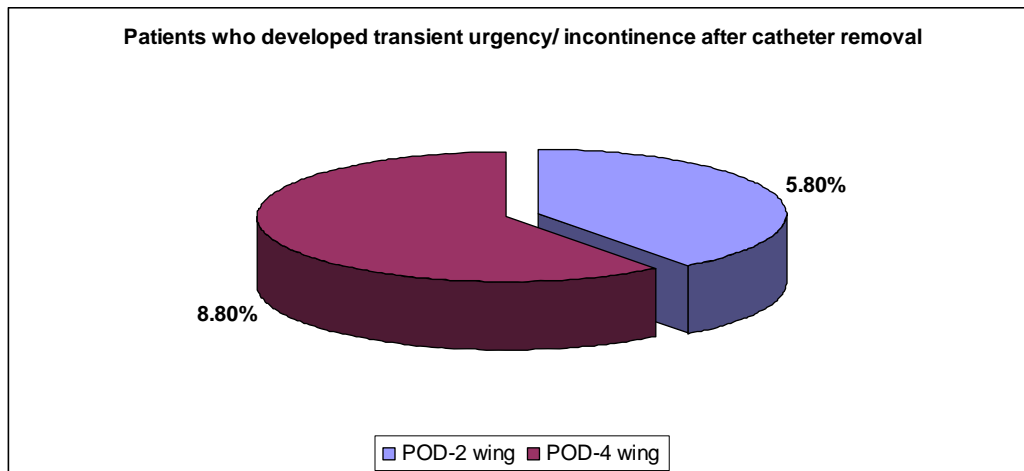
**Fig-3: Patients who had transient bothersome irritative symptoms after removal of catheter**



**Table-4: Patients who developed transient urgency/ incontinence after catheter removal**

Group	Total	Urgency/ Incontinence Patient who developed transient urgency/incontinence after catheter removal	Percentage	P Value
POD-2 wing	34	2	5.8%	0.642 (Not significant)
POD-4 wing	34	3	8.8%	

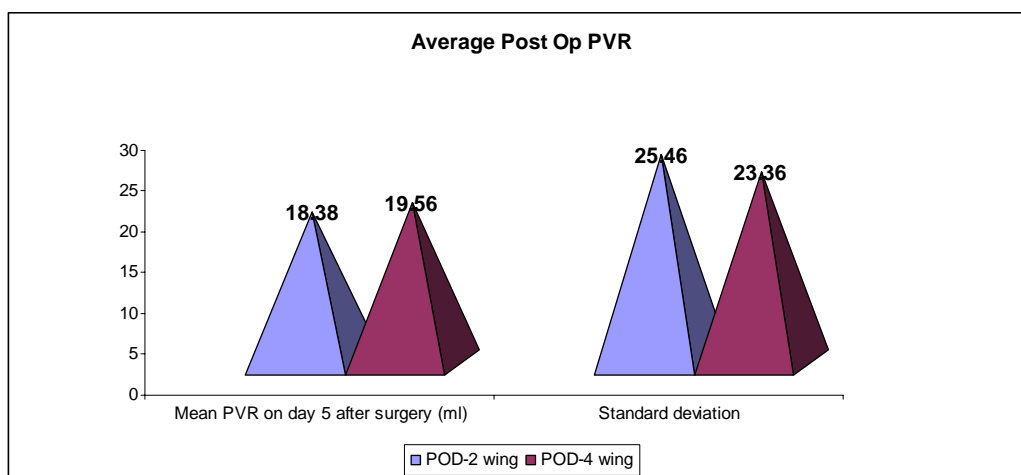
**Fig-4: Patients who developed transient urgency/ incontinence after catheter removal**



**Table-5: Average Post Op PVR**

Group	Mean PVR on day 5 after surgery (ml)	Standard deviation	P Value
POD-2 wing	18.38	25.46	0.843 (Not significant)
POD-4 wing	19.56	23.36	

**Fig-5: Average Post Op PVR**



## **CONCLUSION**

Our study shows that early catheter removal after TURP is beneficial to the patient and does not increase the complication profile. This is supported by the following data.

Over all 11.76% patients in the POD-2 group and 11.76% patients on the POD-4 group developed retention of urine after catheter removal that required recatheterization. Those who failed catheterization (developed retention) in either group were recatheterized and discharged with catheter. Catheter removal was done as an outpatient procedure around 7 days later. No patient in our study had to be on catheter beyond this period.

In the POD-2 group 4 patients developed retention requiring recatheterization. In the POD-4 group 4 patients developed retention requiring recatheterization. There was no statistically significant increase in recatheterisation rate in the POD-2 group, suggesting that urinary retention does not develop at a higher rate when early (POD-2 Vs POD-4) catheter removal is practiced after TURP.

The average Post-Op PVR was 18.38ml in the POD-2 group

and 19.46ml in the POD-4 group. This average PVR was not higher in the POD-2 group when compared with the other group.

After catheter removal, some patients in our study developed transient urgency/ urge incontinence. Again no statistically higher urgency/ incontinence rate was recorded in the POD-2 group.

Some patients reported bothersome increased frequency after catheter removal Post- TURP. This parameter too was not reported at any higher rate in POD-2 group than the POD-4 group.

A question “on a scale of 0-100, how satisfied are you with the treatment for your condition?” was posed to all patients in the study. The POD-2 group patients reported higher scores than the POD-4 group. This is probably related to lesser patients discomfort, lesser requirements for analgesia and earlier discharge from hospital in this group.



## **DISCUSSION**

Rate of recatherization after catheter removal Post-TURP surgery is reported in literature to occur in 0.5-11% of patients. The most common cause for this has been ascribed to hypotonic bladder in literature. It is postulated that age older than 80 and low maximal detrusor pressure are significant predictors to post-op failure to void after catheter removal.

The interval to catheter removal after TURP has decreased significantly in the past 2 decades. The benefit from such a decrease is medical, with a theoretical reduction of known complications of an indwelling catheter (Stricture and infection).

Our study shows that reduction in catheterization periods Post-TURP, is not detrimental to the patients and can in fact be of beneficial value (better patient satisfaction, reduced hospital stay, reduced infection from an indwelling catheter, reduced post operative discomfort and reduced requirements for analgesia). Early removal of catheter did not increase the morbidity and maintained the efficiency of the procedure.

Our study analysed various parameters like post-op PVR, bothersome urgency, bothersome frequently post-catheter removal

urinary retention etc. All these parameters were statistically similar in POD-2 group as in POD-4 group. No statistically significant increase in complication profile was demonstrated in POD-2 group. Hence it would seem reasonable that after TURP, catheter removal on the second post-op day can generally be adopted.

If this practice is adopted as routine, the savings resulting from the reduction in hospital stay would be considerable. Also the patient comfort and acceptance of this procedure (TURP) would increase.

## MASTER CHART POD IV WING OF STUDY

S. No	Patient's Name	IPSS score	Prostate Volume	Pre op Uroflow	Pre op PVR	P.R. Grade	Cystoscopy Grade at TURP	DOS	Catheter removed on	Post – op PVR	Post Op uroflow	Course After Catheter removal
1.	Senkaiyan 60 / M IP:17240	18	55CC	Qmax-6 Qavg-3	200 ml	III	Gr III left lateral Gr II R.Lateral & Median	23.05.11	POD IV	50 ml	Qm-11  Qavg-7	Developed dysuria -treated with antibiotics symptom free on discharge
2.	Durai Raj 52/M IP:19866	21	35CC	AUR	AUR	II	Gr II lateral lobes	13.06.11	POD IV	Nil	Qm-16  Qavg-13	Uneventful
3.	Venkatachalam 75/M IP:20930	20	43CC	Qm-6 Qavg-3	200 ml	III	Gr II trilobar enlargement	22.06.11	POD IV	Nil	Not done as pt unco operative	C/o In continence - Taught Kegel's exercise - Was symptom free on discharge
4.	Krishnan 70/M IP: 21659	27	60CC	Qm-5 Qavg-2	100ml	III	Gr II trilobar enlargement	24.06.2011	POD IV	40 ml	Qmax-9 Qavg-7	C/o dysuria – Treated with antibiotics, was symptom free at discharge
5.	Bakthavachalam 60 yrs/M IP 22126	19	70CC	Qm-7 Qavg-4	150ml	II	Gr II Lateral Lobes	13.02.11	POD IV	35CC	Qm-9 Qavg-7	Developed retention -recatheterised
6.	Kaliappan 74/M IP: 25345	24	35CC	Qmax-7 Qavg-4	150ml	II	Gr II Lateral Lobes	15.3.11	POD IV	50 ml	Qm-10 Qavg-7	C/o Transient Urgency after catheter removal, was symptom free on discharge
7.	Perumal Raj 75/M IP No: 25347	24	45CC	AUR	AUR	II	Gr III Left Lateral Gr II R.Lateral & Median	22.3.11	POD IV	Nil	Qm-10 Qavg-7	Developed Retention recathcterised
8.	Kattaiyan 45/M IPNo: 27238	19	52 CC	AUR	AUR	III	Gr II trilobar enlargement	3.08.11	POD IV	50 ml	Qm-16 Qavg-13	C/o Occasional Haematuria, was symptom free on discharge
9.	Nova 56/M IP No: 28038	15	35CC	Qm-9 Qavg – 6	100 ml	II	Gr II Lateral Lobes	3.8.11	POD IV	Nil	Qm-14 Qavg-11	C/o Dysuria Treated with Antibiotics symptom – free on discharge
10.	Ponnukannu 67/M IP: 25970	13	42CC	AUR	AUR	II	Gr II trilobar enlargement	5.8.11	POD IV	Nil	Qm-12 Qarg – 10	C/o dysuria treated with antibiotics, was symptom free on discharge
11.	Varadhan 73/M IP: 27624	21	48CC	Qm-7 Qavg-4	NIL	III	Gr III left lacteral Gr II R.Lateral & Median	10.8.11	POD IV	Nil	Qm-9 Qavg-7	C/o Incontinence Taught Kegel's Exercises. Symptom free on discharge
12.	Nicolas 60/M IP: 27623	22	50CC	Qm-6 Qavg-3	100ml	II	Gr II trilobar enlargement	10.08.11	POD IV	Nil	Qm-12 Qavg-10	C/o Difficulty in voiding Treated with $\alpha$ blockers. Symptom free on discharge
13.	Kuppan 50/M IP: 25340	17	30CC	Qm-8 Qavg-5	150ml	II	Gr II left lateral Gr I R.lateral	17.8.11	POD IV	50ml	Qm-12 Qavg-10	C/o Dysuria Treated with Antibiotics symptom – free on discharge

S. No	Patient's Name	IPSS score	Prostate Volume	Pre op Uroflow	Pre op PVR	P.R. Grade	Cystoscopy Grade at TURP	DOS	Catheter removed on	Post – op PVR	Post Op uroflow	Course After Catheter removal
14.	Munusamy 58/M IP: 29265	22	35 CC	Qm-9 Qavg-7	100ml	II	Gr II trilobar	19.08.11	POD IV	Nil	Qm-12 Qavg – 10	Uneventful
15.	Radhakrishnan 58/M IP: 28041	24	40CC	AUR	AUR	II	Gr II trilobar	26.08.11	POD IV	Nil	Qm-14 Qavg-12	Uneventful
16.	Kannu 67/M IP:30082	20	35CC	Qm-6 Qavg-4	150 ml	III	Gr II trilobar	26.08.11	POD IV	Nil	Qm-11 Qavg-8	Uneventful
17.	Moorthy 50/M IP: 30499	24	40cc	Qm-9 Qavg-7	150 ml	II	Gr II trilobar	02.09.2011	POD IV	20 ml	Qm-10 Qavg-7	C/o Difficulty in voiding, treated with $\alpha$ blocker was symptom free on discharge
18.	Kumar 60/M IP:27634	23	35CC	AUR	AUR	I	Gr I Lateral lobes	02.09.2011	POD-IV	Nil	Qm-10 Qavg-8	Developed Retention -Recatheterised
19.	Ramalingam 67/M IP:30615	29	44CC	Qm-9 Qavg-5	100ml	II	Gr II Trilobar	14.09.11	POD IV	50 ml	Qm – 10 Qavg-7	C/o, difficulty in voiding treated with $\alpha$ blocker was symptom free on discharge
20.	Shanmugam 55/M IP:1150	31	50CC	Qm-8 Qavg-6	Nil	II	Grade II Left Lateral Gr I Right Lateral	12.10.11	POD IV	Nil	Qm-9 Qavg – 6	C/o Dysuria, Treated with Antibiotics
21.	Mohan 55/M IP:34903	30	50CC	Qm-10 Qavg-6	Nil	II	Gr II Trilobar	14.10.11	POD IV	Nil	Qm-11 Qavg-8	Uneventful
22.	Chinnaiyan 60/M IP:38269	28	58CC	AUR	AUR	III	Grade III Lateral lobes	09.11.11	POD IV	30 ml	Qm-8 Qavg-8	Uneventful
23.	Palayam 70/M IP:38544	32	62CC	Qmax-7 Qavg-5	200 ml	III	Grade II Lateral lobes	09.11.11	POD IV	50 ml	Qm-8 Qavg-6	C/o difficulty in voiding treated with $\alpha$ blockers, was symptom free on discharge
24.	dhanapal 70/M IP 390622	34	69CC	Qm-6 Qavg-3	200 ml	III	Grade III Lateral lobes Grade II Median Lobe	11.11.11	POD-IV	50ml	Qm-8 Qavg-6	C/o difficulty in voiding treated with $\alpha$ blockers was symptoms free on discharge
25.	Buhari 60/M IP:41468	28	70CC	AUR	AUR	III	Grade III Lateral Lobes	2.12.11	POD-IV	Nil	Qm-10 Qavg-8	Uneventful
26.	Selvaraj 58/M IP:40997	26	68CC	Qmax-8 Qavg-6	Nil	II	Grade II trilobar	2.12.11	POD IV	Nil	Qmax-9 Qavg-7	Uneventful
27.	Duraivel 58/M IP: 40997	19	60CC	AUR	AUR	II	Grade II Lateral lobes	07.12.11	POD IV	25 ml	Qmax-9 Qavg-7	Developed Retention Recathcterised
28.	Subramani 70/M IP:41882	17	34CC	Qm-9 Qavg-7	Nil	I	Grade II Lateral Lobes	9.02.11	POD IV	Nil	Qmax-10 Qavg-8	Uneventful
29.	Ravichandran 45/M IP:43547	28	38CC	Qm-10 Qavg-6	Nil	II	Grade II trilobar	14.12.11	POD IV	Nil	Qmax-11 Qavg-7	Uneventful

S. No	Patient's Name	IPSS score	Prostate Volume	Pre op Uroflow	Pre op PVR	P.R. Grade	Cystoscopy Grade at TURP	DOS	Catheter removed on	Post – op PVR	Post Op uroflow	Course After Catheter removal
30.	Samundu 65/M IP:43556	34	42CC	AUR	AUR	II	Grade II Lateral	28.12.11	POD IV	50 ml	Qmax-9 Qavg-8	C/o difficulty in voiding - Treated with $\alpha$ blocker, was symptom free on discharge
31.	Sridhar 65/M IP:44457	32	45CC	AUR	AUR	II	Grade II trilobar	20.1.12	POD IV	Nil	Qmax-10 Qavg-8	Uneventful
32.	Vijayan 72/M IP:2183/12	31	50CC	Qmax-9 Qavg-7	150 ml	II	Grade III Lateral lobes	25.1.12	POD IV	50 ml	Qmax-11 Qavg-7	Uneventful
33.	Sengaiyan 60/M IP:2163	30	40CC	Qmax-9 Qavg-6	100ml	II	Grade II trilobar	1.2.12	POD IV	50ml	Qmax-10 Qavg-8	Uneventful
34.	Kasinathan 56/M IP:2644212	22	44CC	Qmax-11 Qavg-7	150 ml	II	Grade II Lateral Lobes	3.2.12	POD IV	50 ml	Qmax-12 Qavg-8	Uneventful

## POD II WING OF STUDY

S. No	Patient's Name	IPSS score	Prostate Volume	Pre op Uroflow	Pre op PVR	P.R. Grade	cystoscopy Grade at TURP	DOS	Catheter removed on	Post – op PVR	Post Op uroflow	Course After Catheter removal
1.	Kannaiya 77/M IP:15003	20	40CC	Qmax-7 Qavg-4	150 ml	II	Gr II Lateral Lobes	06.05.2011	POD II	Insignificant	Qm-12 Qavg-9	Catheter removed on 2 <sup>nd</sup> POD uneventful
2.	Dakshina moorthy 63/M IP:16022	19	43CC	AUR	AUR	III	Gr II trilobar	20.5.11	POD II	50ml	Qm-10 Qavg-7	Uneventful
3.	Rajagopal 61 yrs/M IP:16477	24	48CC	AUR	AUR	Ii	Gr II Lateral lobes	25.5.11	POD II	30 ml	Qm-13 Qavg-9	Uneventful
4.	Lakshmanan 72/M IP:16468	21	30cc	Qmax-4 Qavg-2	250CC	II	Gr II Left Lateral Gr I Right lateral	25.5.11	POD II	50 ml	Qm-10 Qavg-7	Uneventful
5.	V.Govindasamy 70/M IP:16344	26	52CC	Qm-6 Qavg-3	100cc	III	Gr III Lateral Lobes Gr.I Median lobe	30.5.11	POD II	Insignificant	Qm-9 Qavg-7	C/o Occasional haematuria – 2 <sup>nd</sup> Pod No C/o from 3 <sup>rd</sup> POD
6.	Chinnaiyan 85 / M IP:19286	27	60cc	Qm-4 Qavg-2	200ml	III	Gr III left lateral Gr II Rt lateral Gr II Median	20.6.11	POD II	45 ml	Qm-9 Qavg-6	C/o dysuria treated with antibiotics no C/o on discharge
7.	Krishnan 65/M IP:21804	18	38CC	AUR	AUR	II	Gr II Trilobar enlargement	23.6.11	POD II	Nil	Qm-12 Qavg-9	Uneventful
8.	Duraisamy 62/M IP: 19018	24	43CC	Qm-7 Qavg-4	Insignificant	III	Gr II Lateral lobes	23.06.11	POD II	Nil	Qm-15 Qavg-12	Uneventful

S. No	Patient's Name	IPSS score	Prostate Volume	Pre op Uroflow	Pre op PVR	P.R. Grade	cystoscopy Grade at TURP	DOS	Catheter removed on	Post – op PVR	Post Op uroflow	Course After Catheter removal
9.	Kathambarajan 75/M IP:24039	19	30CC	Qm-12 Qavg-9	Insignificant	I	Gr I Lateral lobes	11.7.11	POD II	Nil	Qm-15 Qavg-12	Uneventful
10.	Abubacker 54/M IP: 27523	21	33CC	AUR	AUR	GII	GII lateral lobes	8.8.11	POD II	Nil	Qm-15 Qavg-11	C/o Dysuria Treated with Antibiotics no C/o on discharge
11.	Jayaraman 62/M IP:26673	14	49CC	AUR	AUR	GII	GII trilobar enlargement	11.08.11	POD II	35ml	Qm-11 Qavg-8	C/o Occasional haematuria / dysuria. Treated with antibiotics no c/o on discharge
12.	Madhavalu 50 yrs IP:28597	21	29CC	Qmax-10 Qavg-7	Nil	GI	GI lateral lobes	18.8.11	POD II	Nil	was not possible as VV less than 60 ml	C/o difficulty in voiding, was treated with $\alpha$ blockers recovered and had no complaints at discharge
13.	Mohideen 69/M IP:28595	29	43CC	AUR	AUR	II	Gr II trilobar enlargement	25.8.11	POD II	80 ml	Was not possible as VV law	C/o difficulty in voiding, treated with $\alpha$ blockers. Was symptom free on discharge
14.	Ayyakannu 60/M IP:28598	31	60VV	AUR	AUR	GII	G II Lateral lobes	25.08.11	POD II	75 ml	Qm-9 Qavg-7	C/o difficulty in passing urine. Treated with $\alpha$ blockers was symptoms free on discharge
15.	Philominraj 74/M P:30638	28	35CC (outside USG report 120 CC)	Nil	Qmax-6 Qavg-4	I	Gr II Lateral lobes	25.08.11	POD II	Nil	Qm-11 Qavg-7	Uneventful
16.	Govidan 60/M IP:30767	14	52CC	Nil	Qmax-5 Qavg-3	III	Gr II trilobar enlargement	05.09.11	POD II	Nil	Qm-7 Qavg-5	C/o difficulty in voiding treated with $\alpha$ blockers symptom free at discharge
17.	Ranganathan 75/M IP:30767	21	38CC	60ml	Qmax-5 Qavg-2	II	Gr.II lateral lobes	19.09.11	POD II	Nil	Qm-7 Qavg-5	Uneventful
18.	Ali Hossain 70/M IP:37732	24	53CC	Qmax-10 Qarg-6	100ml	III	Gr II trilobar	31.10.11	POD II	Nil	Qmax-12 Qavg-10	Developed retention recatheterised
19.	Krishnan samy 61/M IP:39304	21	60CC	Qmax-8 Qavg-5	150CC	II	Grade II Lateral lobes	07.11.11	POD II	Nil	Qmax-9 Qavg-7	Developed Retention recatheterised
20.	Chandriah 65/M IP:39457	19	48CC	AUR	AUR	II	Grade II Lateral lobes Grade I Median Lobe	17.11.11	POD II	50ml	Qmax-14 Qavg-12	Uneventful
21.	Rajamanickam 65/M IP:40256	30	35CC	Qmax-9 Qavg-5	180 ml	I	Grade II left Lateral Grade I Right Lateral	21.11.11	POD II	Nil	Qmx-10 Qavg-8	Uneventful
22.	Mohadmeeran 76/M IP:40504	31	42CC	AUR	AUR	II	Grade II trilobar	21.11.11	POD II	30 ml	Qmax-14 Qavg-10	C/oDysuria, treated with Antibiotics
23.	Chinna Thambi 70/M IP:41553	27	40CC	Qmax-7 Qavg-3	250 ml	II	Grade II trilobar	24.11.11	POD II	Nil	Qmax-12 Qavg-8	C/o.Incontinence- taught kegels exercises, was symptom free on discharge

S. No	Patient's Name	IPSS score	Prostate Volume	Pre op Uroflow	Pre op PVR	P.R. Grade	cystoscopy Grade at TURP	DOS	Catheter removed on	Post – op PVR	Post Op uroflow	Course After Catheter removal
24.	Lakshmanan 60/M IP:41328	20	33CC	AUR	AUR	I	Grade II left lateral Grade I Right lateral Grade I median lobe	28.11.11	POD II	50 ml	Qmax – 15 Qavg-10	C/o Difficulty in voiding treated with $\alpha$ blockers
25.	Shanmugam 50/M IP:43014	15	48CC	Qmax-10 Qavg-8	PVR-150 ml	II	Grade II trilobar	5.12.11	POD II	Nil	Qmax-12 Qavg-8	Developed retention recatheterised
26.	Rangasamy 65/M IP:48676	17	60CC	AUR	AUR	III	Grade III Lateral lobes	5.12.11	POD II	Nil	Qmax-10 Qarg-8	Uneventful
27.	Chakrathy 60/M IP:42493	20	64VV	Qmax – 11 Qavg-8	PVR- 200ml	III	Grade III Lateral lobes	08.12.11	POD II	45CC	Qmax-11 Qavg-9	Uneventful
28.	Mani 60/M IP:43035	19	58CC	Qmax-9 Qavg-6	100ml	III	Grade II trilobar	12.12.11	POD II	Nil	Qmax – 9 Qavg-7	C/o. Incontinence Taught Kegels exercises, symptom free on discharge
29.	Shanmugam 65/M IP: 44100	27	60CC	Qmax-10 Qavg-6	75ml	II	Grade II Lateral lobes	19.02.12	POD II	30 ml	Qmax-11 Qavg-6	Uneventful
30.	Iyyavoo 65/M IP:421/12	32	38CC	AUR	AUR	I	Grade II Lateral lobes	09.1.12	POD II	40 ml	Qmzx-8 Qar-6	Developed retention recatheterised
31.	Thangaraj 57/M IP:1265/12	30	62CC	Qmax-9 Qavg-5	120ml	Ii	Grade III trilobar enlargement	30.1.12	POD II	50 ml	Qmax-10 Qavg-6	Uneventful
32.	Chittaiya 55/M IP:1965/12	18	35CC	Qmax-11 Qavg-7	PVR – 150 ml	II	Grade II lateral lobe	30.1.12	POD-II	Nil	Qmax-11 Qavg-8	Uneventful
33.	Kuttan 70/M IP:2957/12	21	62CC	AUR	AUR	II	Grade II Lateral lobes	2.2.12	POD II	45 ml	Qmax-8 Qavg-6	Uneventful
34.	Abdul Khadhar 60/M IP:2283	32	44CC	AUR	AUR	I	Grade II lateral lobes	02.02.12	POD II	Nil	Qmax-8 Qavg-6	Uneventful

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INSTITUTIONAL ETHICAL COMMITTEE,  
STANLEY MEDICAL COLLEGE, CHENNAI-1

Title of the Work : A Study on removal Urethral Catheter on Post Op  
Day ~~2~~ versus the conventional Post Op day - 4

Principal Investigator : Dr.D.Jason Philip

Designation : PG in M.Ch (Urology)

Department : Department of Urology  
Government Stanley Medical College,  
Chennai-1

The request for an approval from the Institutional Ethical Committee (IEC) was considered on the IEC meeting held on 18.04.2011 at the Modernized Seminar Hall, Stanley Medical College, Chennai-1 at 2PM

The members of the Committee, the secretary and the Chairman are pleased to approve the proposed work mentioned above, submitted by the principal investigator.

The Principal investigator and their team are directed to adhere to the guidelines given below:

1. You should inform the IEC in case of changes in study procedure, site-investigator investigation or guide or any other changes.
2. You should not deviate from the area of the work for which you applied for ethical clearance.
3. You should inform the IEC immediately, in case of any adverse events or serious adverse reaction.
4. You should abide to the rules and regulation of the institution(s).
5. You should complete the work within the specified period and if any extension of time is required, you should apply for permission again and do the work.
6. You should submit the summary of the work to the ethical committee on completion of the work.

 02/11/2011  
MEMBER SECRETARY,  
IEC, SMC, CHENNAI

## PROFORMA

Name:

Age:

Sex:

Address:

Ph:

DOA

DOS

DO Catheter removal

DOD

Presenting Symptoms

Duration

Co-morbid conditions

Clinical examination findings on presentation

Investigations

Operative findings

Post-op period

Complications, if any

Patients feedback